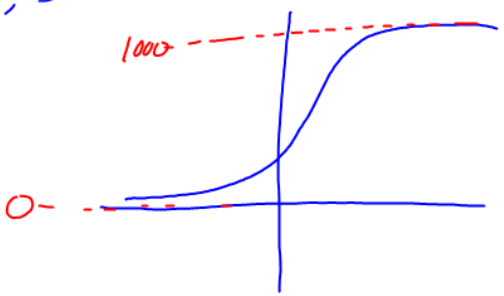
Do 3.5 #39, 53, 54



(a) $P(t) = \dfrac{1000}{1+9e^{-0.1656t}}$

(b) $P(5) = \dfrac{1000}{1+9e^{-0.1656 \cdot 5}}$

$P(5) \approx 203$

(c) $500 = \dfrac{1000}{1+9e^{-0.1656t}}$ $\cdot\ 1+9e^{0.1656t}$

$\dfrac{500}{500}(1+9e^{-0.1656t}) = \dfrac{1000}{500}$

$1+9e^{-0.1656t} = 2$

$\ln e^{-0.1656t} = \ln \frac{1}{9}$

$\dfrac{-0.1656t}{-0.1656} = \dfrac{\ln\left(\frac{1}{9}\right)}{-0.1656}$

$t \approx 13.268$

$$t = -10 \ln \frac{T - 70}{98.6 - 70}$$

$$\frac{T - T_S}{T_I - T_S}$$

$$t = -10 \ln \frac{85.7 - 70}{98.6 - 70}$$

$$t = 6 \text{ hrs}$$

but 9:00 am − 6 hrs = 3:00 am

(54)

$$t = -5.05 \ln \frac{T-40}{0-40}$$

$$t = 5.05 \ln \frac{32-40}{(0-40)}$$

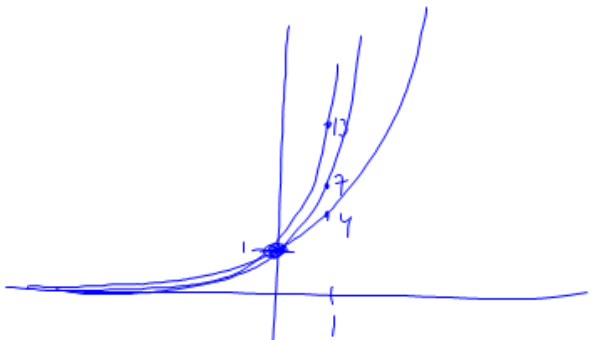
$$t = 8.128 \text{ hrs.}$$

Review Section

#5-8, 34, 36, 41, 43, 57, 69, 73, 87, 90, 97, 101, 106,

Solve 116 for x if $y = 5.5$

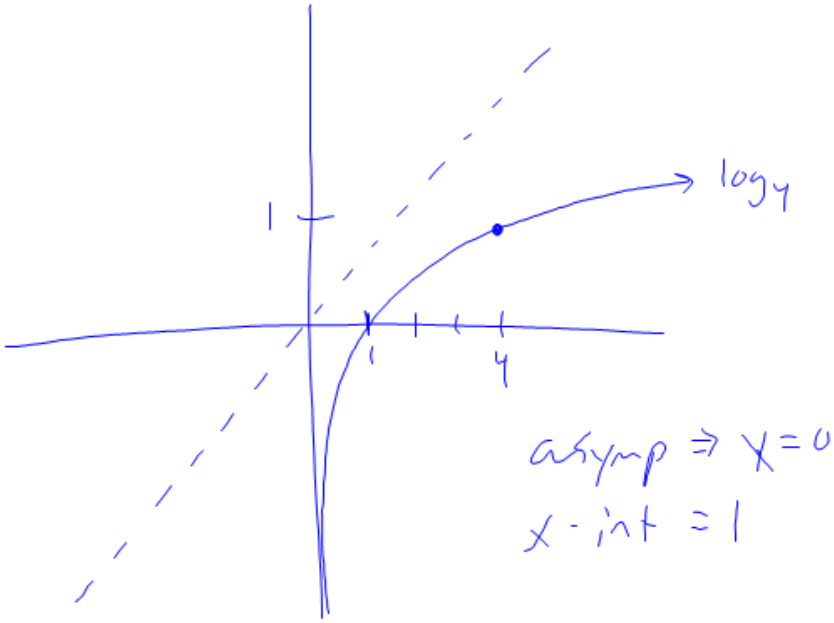
Graphing



$4^0 = 1$ $\quad 4^1 = 4$

$7^0 = 1$ $\quad 7^1 = 7$

$13^0 = 1$ $\quad 13^1 = 13$

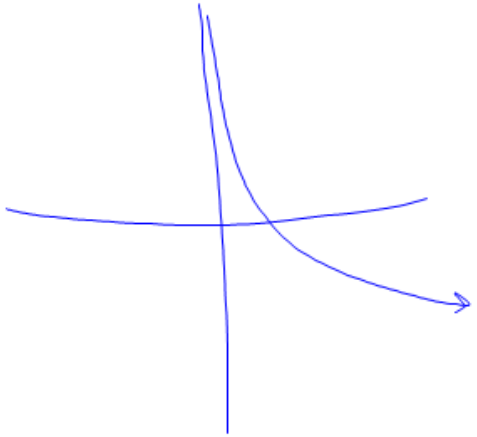


$\log_4$

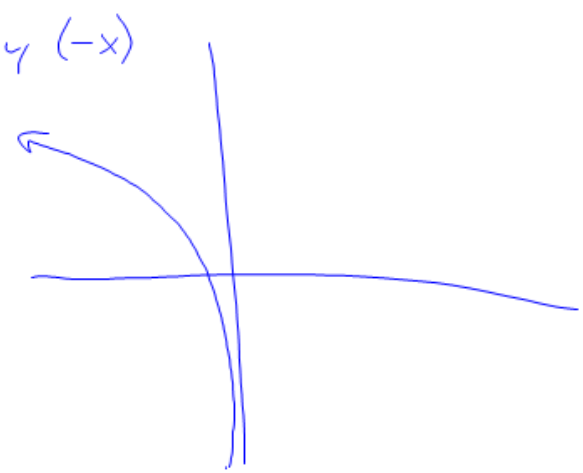
asymp $\Rightarrow x = 0$

x-int $= 1$

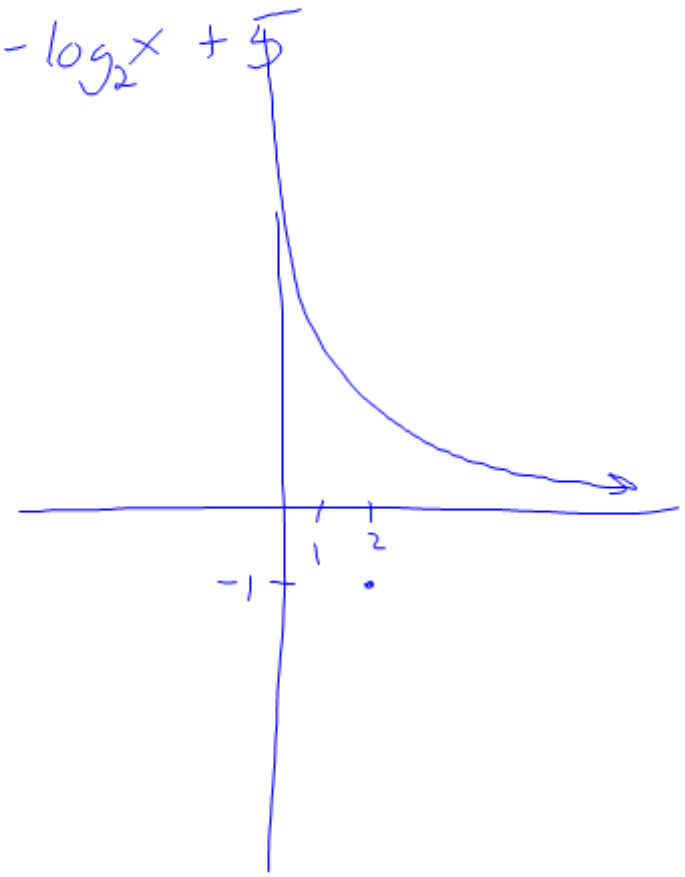
$-\log_4 x$



$\log_4(-x)$



$y = -\log_2 x + 5$



asympt. $x = 0$

x-int - solve it

$0 = -\log_2 x + 5$

$-5 \qquad -5$

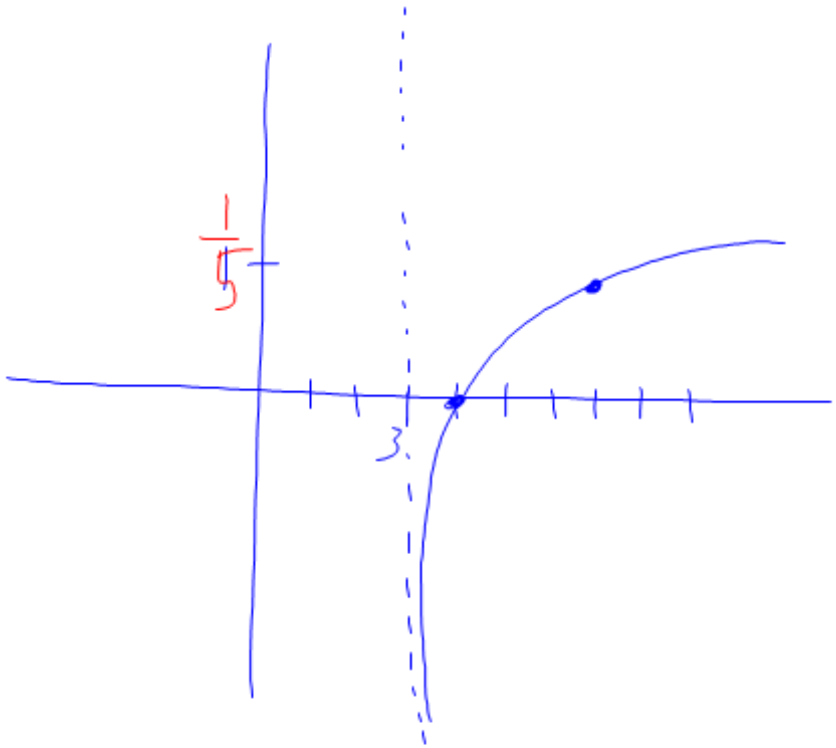
$\frac{-5}{-1} = \frac{-\log_2 x}{-1}$

$5 = \log_2 x$

$2^5 = x$

$32 = x$

$y = \frac{1}{5}\log_4(x-3)$



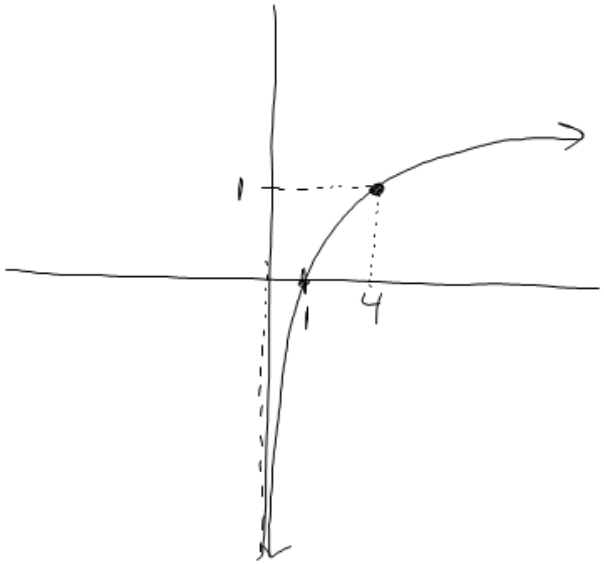
$y = \log_4 x$

$y_1 = \frac{\log x}{\log 4}$

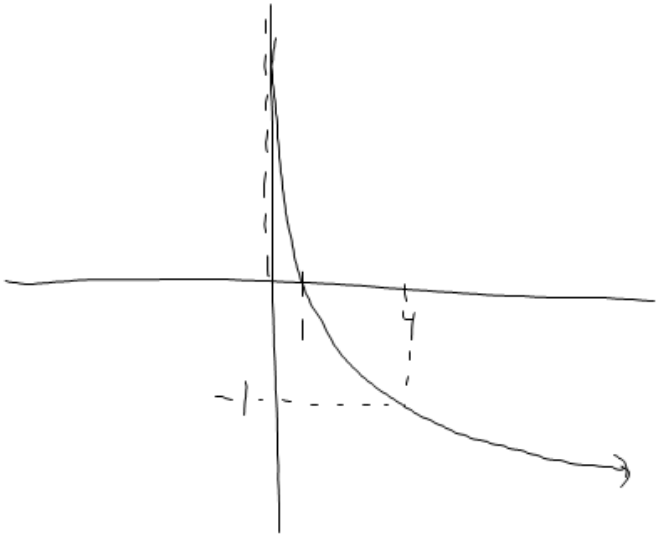
$y = \log_4(x-3)$

$y_1 = \frac{\log(x-3)}{\log 4}$

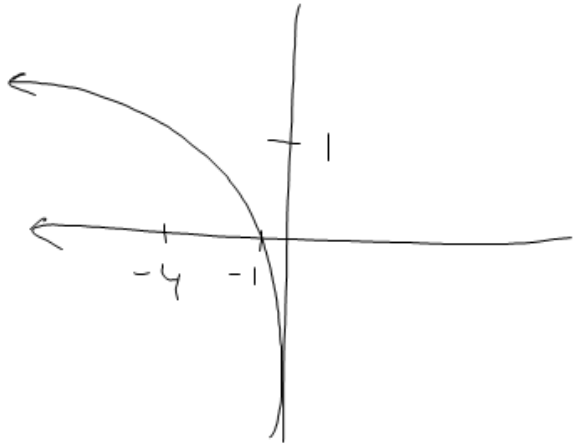
$y = \log_4 x$



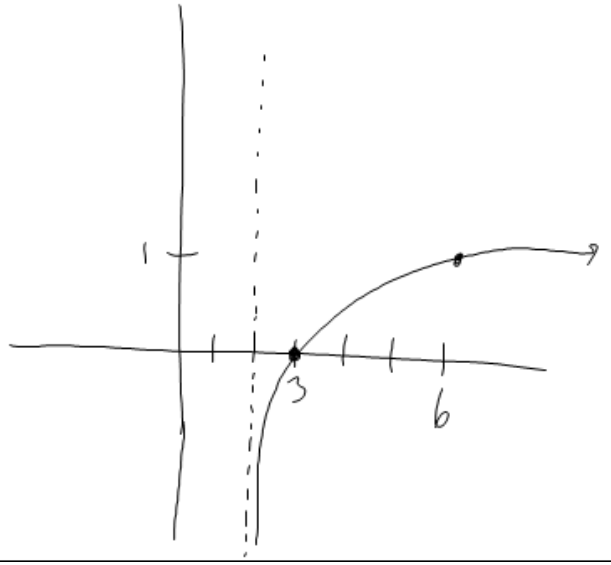
$y = -\log_4 x$



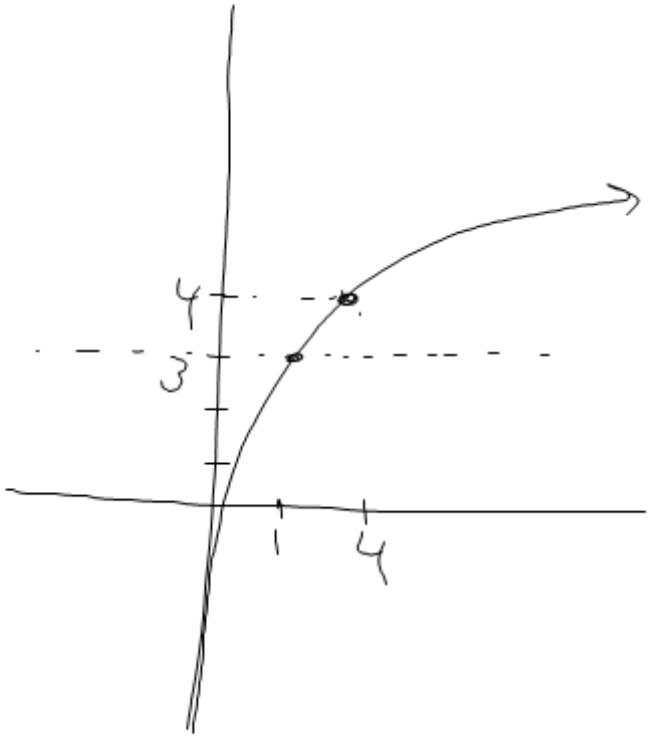
$y = \log_4 (-x)$



$y = \log_4 (x-2)$



$y = \log_4 x + 3$



asymp. $x = 0$

Domain $(0, \infty)$

x-int $= \frac{1}{64}$

$y = \log_4 x + 3$

$0 = \log_4 x + 3$

$-3 \qquad -3$

$-3 = \log_4 x$

$4^{-3} = x$

3.5 #53, 54

$$\frac{100}{130} = \frac{130e^{k \cdot 30}}{130}$$

$$\ln \frac{100}{130} = \ln e^{30 \cdot k}$$

$$\ln\left(\frac{100}{130}\right) = 30 \cdot k$$

$$k = \frac{\ln\left(\frac{100}{130}\right)}{30} \approx -0.00875$$

Test

- Properties of logarithms
- Solve all types of exponential/logarithmic equations
- graphing by hand, asymp., x-int.
- equation through two points $y = ae^{bx}$
- Application Problem (Newton's Law Cooling)

$7^x = 47$

$\log_7 47 = x$

$x = \frac{\log 47}{\log 7}$

$a^{\log_a x} = x$ and $\log_a a^x$

~~$\ln e^x$~~